Claims:

1. A method for filtering comprising adaptive filtering an input signal (x(n)), interpolating the filtered signal, interpolating the input signal (x(n)) for adapting the adaptive filtering, **characterised** in that the properties of the interpolation of the filtered signal are adaptable.

2. The method according to claim 1, **characterised** in that it comprises providing a reference signal (d(n)+z(n)), and combining the interpolated filtered signal and the reference signal for forming an error signal (e(n)).

3. The method according to claim 2, **characterised** in that the interpolation properties are adapted according to the error signal (e(n)) and the interpolated filtered signal ($Y_I(n)$).

4. The method according to claim 2 or 3, **characterised** in that the interpolation properties are adapted by changing at least one coefficient of the interpolation.

5. The method according to claim 4, **characterised** in that the at least one coefficient of the interpolation is adapted by using a normalized least mean square algorithm, wherein the error signal and the interpolated filtered signal are used as inputs for the algorithm.

6. The method according to any of the claims 2 to 5, **characterised** in that it comprises the following steps:

a) computing the filtered output by equation

$$y(n) = \mathbf{W}^t(n)\mathbf{X}(n);$$

b) computing the interpolated filtered signal by equation

$$Y_I(n) = \mathbf{I}^t(n)\mathbf{Y}(n);$$

c) adapting the interpolation coefficients by equation

$$\mathbf{I}(n+1) = \mathbf{I}(n) + \frac{\mu_I}{\varepsilon + \mathbf{Y}^t(n)\mathbf{Y}(n)} e(n)\mathbf{Y}(n)$$

where μ_I is the step-size used to adapt the coefficients of the interpolator, $e(n)$ is the output error, $\mathbf{I}(n) = [i(n)_1, i(n)_2, \ldots, i(n)_M]^t$ is the $M \times 1$ vector containing the coefficients of the interpolator, $\mathbf{Y}(n) = [y(n), y(n-1), \ldots, y(n-M+1)]^t$ is the vector of the past M samples from the signal $y(n)$, and ε is a small constant;

d) computing the output error $e(n)$ by equation

$$e(n) = d(n) + z(n) - y_I(n);$$

e) computing the filtered input vector $\mathbf{X}_I(n)$ by equation

$$\mathbf{X}_I(n) = \sum_{j=0}^{M-1} i_j \mathbf{X}(n-j); \text{ and}$$

f) updating filtering weights by equation

$$\mathbf{W}(n+1) = \mathbf{F}\{\mathbf{W}(n) + \mu e(n)\mathbf{X}_I(n)\} + \mathbf{q}.$$

7. The method according to any of the claims 1 to 6, **characterised** in that finite impulse response filtering is used in said adaptive filtering.

8. An apparatus (1) comprising an adaptive filter (2) for filtering an input signal (x(n)), a first interpolator (3) for interpolating the filtered signal, a second interpolator (7) for interpolating the input signal (x(n)), wherein the interpolated input signal is arranged to be used to adapt the adaptive filter (2), **characterised** in that the apparatus (1) further comprises a first adapting block (4) for adapting the properties of the first interpolator (3).

9. The apparatus (1) according to claim 8, **characterised** in that it also comprises an input (5.2) for receiving a reference signal (d(n)+z(n)), and a combiner (5) for combining the interpolated filtered signal and the reference signal for forming an error signal (e(n)).

10. The apparatus (1) according to claim 9, **characterised** in that the interpolation properties are arranged to be adapted according to the error signal (e(n)) and the interpolated filtered signal ($Y_I(n)$).

11. The apparatus (1) according to claim 9 or 10, **characterised** in that the first adapting block (4) is arranged to change at least one coefficient of the first interpolator (3).

12. The apparatus (1) according to claim 11, **characterised** in that the first adapting block (4) is arranged to use a normalized least mean square algorithm to adapt the at least one coefficient of the first interpolator (3), wherein the error signal and the interpolated filtered signal are arranged to be used as inputs for the algorithm.

13. The apparatus (1) according to any of the claims 8 to 11, **characterised** in that it also comprises a second adapting block (6) for adapting the properties of the adaptive filter (2).

14. The apparatus (1) according to any of the claims 8 to 13, **characterised** in that said adaptive filter (2) is a FIR filter.